Attorney Docket No. AVID.13-2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	LUMPKIN, ET AL.		
SERIAL NO.:	09/685,284	EXAMINER:	KRAMER, D.
FILED:	OCTOBER 10, 2000	ART UNIT:	3613
TITLE:	CABLE FEED FOR A MECHANICAL BALL BEARING DISC BRAKE		

VIA HAND DELIVERY

Assistant Commissioner for Patents
Washington, D.C. 20231

RESPONSE TO OFFICE ACTION DATED SEPTEMBER 14, 2001

Sir:

Applicant responds to the Office Action mailed September 14, 2001, as follows:

Deficiencies in Information Disclosure Statement

Submitted herewith is a new Information Disclosure Statement substituting the Information Disclosure Statement having patent numbers that do not match up with the names and publication dates on the IDS. The requisite fee ($180) for consideration of this IDS is also submitted herewith .

Claim Rejections

The Rejection of Claims 2-5, 8, 10-13, and 16 under 35 U.S.C. § 103(a) over Huang and Tosdale.

Claims 2-5, 8, 10-13 and 16 stand rejected under 35 USC § 103(a) as being unpatentable over Hunag, U.S. Patent No. 6,230,850 and Tosdale, U.S. Patent No. 5,191,866. Applicant respectfully traverses this ground of rejection.

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Claim 2 is directed to a cable actuated mechanical disc brake caliper. The disc brake caliper includes a caliper housing having a cable guide rigidly fixed to the housing with the cable guide having a cable receiving bore extending along the guide axis for axially receiving the cable. A lever arm is pivotally attached to the caliper housing for pivoting about a pivot axis. The lever arm is operatively associated with a brake pad to

move the brake pad between a retracted and extended position as the lever arm is pivoted in a first direction from a non-actuated position to a fully actuated position. The lever arm includes a cable clamp radially spaced from the pivotal attachment for fixedly attaching a cable to the lever arm in select orientation relative to the lever arm at an attachment point. The attachment point is essentially co-incident with the guide axis with the cable arm in a fully actuated position. A guide surface curved about the pivot axis has a first portion attached to the lever arm with the attachment point of the cable being essentially coincident therewith. A second portion of the curved surface is circumferentially spaced from the first portion with the second portion being essentially tangent to the guide axis with the lever arm in a non-actuated position. As set forth in the application and the Declaration of Wayne Lumpkin submitted herewith, the structure recited in claim 1 provides a cable feed which minimizes friction on the cable. Minimizing the cable friction results in excellent modulation, smoothness in operation and enhanced braking power.

Claim 10 also recites a cable actuated mechanical disc brake caliper. The mechanical disc brake caliper of claim 10 includes a caliper housing and a cable guide rigidly affixed to the housing with the cable guide having a cable receiving bore extending along a guide axis for axially receiving a cable. A lever arm is pivotally attached to the caliper housing for pivoting about a pivot axis. The lever arm is operatively associated with a brake pad to move the brake pad between a retracted and an extended position as the lever arm is pivoted in a first direction from a fully non-actuated position to a fully actuated position. The lever arm includes a cable clamp radially spaced from the pivotal attachment for fixedly attaching a cable to the lever arm in a select orientation relative to the lever arm at an attachment point. A guide surface which is curved about the pivot axis has a first portion attached to the lever arm with the attachment point of the cable essentially coincident therewith. A second portion of the curved guide surface is circumferentially spaced from the first portion and the second portion is essentially tangent to the guide axis with the lever arm in the non-actuated position. Like the structure recited in claim 2, this structure minimizes cable friction resulting in excellent modulation, smooth operation and enhanced power.

Huang fails to teach or suggest a cable guide rigidly fixed to a housing. Referring to Fig. 1, the cable guide attached to the caliper housing is shown extending from the caliper housing at about 1:30. The cable guide is shown as a barrel which appears to be pivotally mounted between two extending flanges. The pivoting nature of this cable guide is also apparent from observation of Fig. 2. The straight line of the cable indicates both the cable guide and the cable fastener pivot. Not only does the cable guide appear to pivot, nowhere in Huang is there any indication that the cable guide is intended to be fixed relative to the caliper housing. This pivoting cable guide is similar to prior art structures described in the Background of the Invention of the present application and is intended to pivot so as to minimize friction on the cable as the lever arm is actuated. However, as discussed in the Background of the Invention, the inventors recognized the deficiency of this structure because the pivoting cable guide is subject to locking in place due to the action of grit or other contaminants. Thus, Huang shows one of the very structures the claimed invention was intended to improve.

Tosdale is cited as providing a curved guide surface about a pivot axis 22. As an initial matter, Tosdale appears to fail to teach the rigid cable guide recited in claims 2 and 10 and therefore fails to overcome the deficiencies of Huang. More particularly, the structure analogous to the cable guide appears to be attached to a L bracket as illustrated in Fig. 1. This L bracket would appear to pivot about its base as the cable 16 moves about the curved surface of the crank means 24.

Moreover, there is no reason why one skilled in the art would be led to combine the teachings of Tosdale with that of Huang so as to result in the claimed invention. Huang teaches a prior art structure for minimizing cable friction, namely providing a pivoting cable feed. Thus, there is no indication in Huang of any need to further reduce cable friction or advantage whatever to be provided by the curved surface of the crank 24 of Tosdale. If anything, Huang would teach away from providing the curved surface of Tosdale. Even if one were to assume that it would be evident to one skilled in the art that the curved surface of Tosdale could provide some advantage to the structure of Huang, such as minimizing friction on the cable, such a feature would be appear to be superfluous in light of the pivoting cable guide of the Huang structure. Moreover, Tosdale provides no express teaching of the advantages of the curved surface on the

crank 24. However, it would appear that the purpose is to provide a diminishing mechanical advantage to a throttle as the crank rotates. There simply is no impetus or suggestion that such a structure could have advantages in a mechanical caliper brake of Huang.

Accordingly, for these reasons Applicant respectfully submits Huang and Tosdale fail to teach the combination of elements recited in independent claims 2 and 10 and furthermore fail to provide any impetus to combine their teachings in the manner suggested by the Examiner.

The Rejection of Claims 2-5, 8, 10-13, and 16 over Toyomasu in view of Tosdale.

Claims 2-5, 8, 10-13 and 16 further stand rejected under 35 USC § 103(a) as being unpatentable over Toyomasu, U.S. Patent No. 3,765,511, in view of Tosdale. Fig. 1 of Toyomasu teaches a cable guide at roughly 29 which appears to be fixed relative to a caliper housing. However, Toyomasu further teaches at Fig. 20 a cable guide at 42 which is pivotally attached to the caliper housing. Thus, Fig. 20 teaches the same prior art solution to minimizing cable friction as taught in Huang and as discussed in the Background of the Invention. To the extent one was looking at the structure of Toyomasu shown in Fig. 1 and looking for a solution to minimize cable friction, one would be led to the structure of Fig. 20. Thus, one skilled in the art reviewing Toyomasu would not be lead to look to other prior art for potential solutions to minimize cable friction.

Tosdale does not overcome the deficiencies of Toyomasu. First, as discussed above, Tosdale does not provide any express teaching of combining a fixed cable feed and a curved surface. Second, Tosdale does not provide any indication that its curved surface has attributes that would be desirable in combination with the structures taught in Toyomasu. In particularly, Tosdale does not provide any teaching that the curved surface of the crank 24 is useful for minimizing friction. To the contrary, Tosdale is directed to a throttle control system for automotive vehicles. The curved surface of the crank 24 is eccentric in shape to provide less mechanical advantage and therefore greater resistance as one depresses an accelerator. There is little or no concern with friction in the foot operated throttle of Tosdale as the foot of an operator can easily overcome any friction on the cable, unlike Applicant's invention directed to a disc brake caliper actuated by the

fingers of a user on a brake lever. Thus, there is clearly no impetus to one skilled in the art to combine the teachings of Tosdale and those of Toyomasu to result in the combination of claimed elements of claims 2 and 10, specifically a lever arm having a curved guide surface and a caliper housing having a fixed cable guide.

The failure of the prior art to teach or suggest the combination of elements of claims 2 and 10, as well as any impetus to combine the references as asserted by the Examiner compels a withdrawal of the rejections under 35 USC § 103(a) of claims 2 and 10, as well as claims 3-5, 8, 11-13, and 16 depending therefrom.

Secondary Considerations Indicative of Nonobviousness

In addition to the lack of a *prima facie* showing of obviousness over the applied references, it is important to note that there are a number of secondary considerations which compel a conclusion of non-obviousness.

Enclosed is a declaration submitted by Wayne R. Lumpkin, inventor of the claimed brake caliper. This declaration is provided to show evidence of secondary considerations. Evidence of secondary considerations should always be considered by the Examiner as a part of all the evidence, and not merely when the Examiner remains in doubt after reviewing the prior art. *Cable Elec. Prods, Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1026, 226 U.S.P.Q. 881, 887 (Fed. Cir. 1985), *overruled on other grounds by Midwest Indus., Inc. v. Karavan Trailers, Inc.*, 175 F.3d 1356, 50 U.S.P.Q.2d 1672 (Fed. Cir. 1999). Acceptable forms of secondary considerations include

> copying, long felt but unsolved need, failure of others, *see Graham v. John Deere Co.*, 383 U.S. 1, 17-18, (1966), commercial success, *see In re Huang*, 100 F.3d 135, 139-40, 40 U.S.P.Q.2d 1685, 1689-90 (Fed. Cir. 1996), unexpected results created by the claimed invention, unexpected properties of the claimed invention, *see In re Mayne*, 104 F.3d 1339, 1342, 41 U.S.P.Q.2d 1451, 1454 (Fed. Cir. 1997); *In re Woodruff*, 919 F.2d 1575, 1578, 16 U.S.P.Q.2d 1934, 1936-37 (Fed. Cir. 1990), licenses showing industry respect for the invention, *see Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957, 43 U.S.P.Q.2 1294, 1297 (Fed. Cir. 1997); *Pentec, Inc. v. Graphic Controls Corp.*, 776 F.2d 309, 316, 227 U.S.P.Q. 766, 771 (Fed. Cir. 1985), and skepticism of skilled artisans before the invention, *see In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1532 (Fed. Cir. 1988).

In re Rouffet, 149 F.3d 1350, 1355; 47 U.S.P.Q.2d 1453 (Fed. Cir. 1998). In particular, the declaration provides evidence of a long-felt but unsolved need for a mechanical disc

brake competitive with a hydraulic disc brake and the failure of others to produce alternatives to the claimed invention; professional skepticism followed by professional approval; evidence of commercial success of devices falling within the patent's claims flowing from the functions and advantages disclosed or inherent in the claimed invention; and copying by others.

Background

Hydraulic disc brakes have been preferred on high-end mountain bikes for a number of performance reasons, including power, modulation, and smoothness of actuation or lever pull of the systems. Hydraulic disc brakes do have disadvantages. Some of the drawbacks of hydraulic brakes are: the need for a dedicated brake lever, the difficulty of installation, the weight, the use of hydraulic fluid, which can be inconvenient or messy, and excessive expense.

Mechanical disc brakes have been marketed since the 1970's. Mechanical disc brakes that were developed prior to the present invention did not have some or all of the disadvantages of hydraulic brakes, such as the need to use hydraulic fluid. Typical of the mechanical disc brakes in this category were those manufactured by Shimano, Formula, and Diatech. These mechanical disc brakes, however, performed poorly in that they lacked adequate power, were relatively difficult to actuate because of internal friction and friction on the cable and provided for poor modulation (or control of braking power). To the extent that these brakes were available, they were offered on lower-priced bike models, and were not considered to be suitable replacements for hydraulic disc brakes on mountain bikes. Accordingly, there was a need to develop a mechanical disc brake suitable for mountain bikes which retained the smoothness, power, and modulation of the hydraulic disc brakes, but which did not suffer from the disadvantages of hydraulic disc brakes, namely heavy weight, high price, necessity of hydraulic fluid and difficult or higher skill level required for maintenance.

Avid, LLC, assignee of the entire interest of the present application, manufactures higher end mountain bicycle components, in particular, brakes. Prior to the present invention, Avid, LLC did not manufacture hydraulic or mechanical disc brakes. In surveying products available on the market, inventor Wayne Lumpkin recognized that some of the problems of prior art mechanical disc brakes resulted from friction on the

actuating cable. As a means of reducing cable friction, Mr. Lumpkin conceived of the claimed mechanical disc brake featuring a cable feed structure consisting of a fixed cable guide defining a guide axis and a curved guide surface attached to an actuating lever arm. The curved guide surface has a first portion attached to the lever arm with an attachment point for the cable essentially coincident therewith and a second portion circumferentially spaced from the first portion, the second portion being essentially tangent to the guide axis with the lever arm in the non-actuated position. This feature eliminates friction causing bends or kinks in the cable and maintains the cable essentially co-linear with the cable guide axis during brake actuation, although the curved surface may have a varying radius if desired, minimizing cable friction. Minimizing cable friction contributes to improved modulation, ease of lever actuation, smoothness and power in the same range as found in hydraulic brakes. It also requires less force from the lever return spring, further easing actuation, reducing user fatigue and facilitating one finger braking.

Skepticism of Experts and Professional Approval; Long-Felt Need and Failure of Others

Upon introduction of the claimed apparatus into the marketplace (Exhibit J), there was an immediate and significant reaction, in the form of expressions of surprise by experts in the field. The reaction of experts in the field to the invention upon its initial public appearance is relevant in determining non-obviousness. Expressions of immediate surprise weigh in favor of non-obviousness. Favorable comments in trade and public publications are recognized as direct technical evidence of non-obviousness. *See Jenn-Air Corp. v. Modern Maid Co.* 499 F. Supp. 320, 209 USPQ 295 (D. Del. 1980), *aff'd*, 659 F.2d 1068 (3d Cir. 1981).

Submitted herewith are copies of relevant portions of articles in mountain bike trade and public publications in support of this argument. In addition to the expression of surprise, the articles provides evidence of a long-felt need for a superior mechanical disc brake, a need which was not met by others. For example, an article from Mountain Biking UK – MBUK.COM, Avid Mechanical Disc Brakes, Nov. 3, 2000, <http://www.mbuk.com/test_comp_page.asp?sec=TST&id=6297> (Exhibit A) reports that "Cable-operated discs have a bit of a bad reputation, but that's about to change, thanks to Avid. . . . [A]t long last there is a cable-operated disc which works well enough to rival

even some hydraulic disc brakes." Similarly, Mike Ferrentino, *Affordable Disc Brakes* BIKE July, 2001, 84, (Exhibit B) reports that:

> The initial buzz surrounding the new Avid mechanical disc late last year was one of massive surprise. Here was this cable-actuated disc brake with ferocious stopping power and love-me-tender modulation. How could this be? Cable discs were supposed to be grossly under-powered and just plain ugly feeling. Or so everyone thought until Avid came along and overturned the apple cart. . . . I am not sure what virgin sacrifice or chicken entrail reading went on at Avid to make this brake work so well in comparison to what came before, but it worked, that's for sure.

Danny Milner, *Avidly awaited, at* http://www.madformountainbiking.com/MTBK/Articles.nsf/c9aef7befcecac86802568dc003a03e0/c595e3eb62645305802569980 04656ef?OpenDocument (Nov. 17, 2000) (Exhibit C) reports that:

> Last year we had the misfortune of riding a lot of bikes with mechanical or cable operated disc brakes. Without exception, they were all hugely disappointing, with less power than a V-brake but extra weight and little consistency. We'd heard great things about . . . the Avid Mechanical . . . but with past experiences firmly etched in our memory we remained sceptical (sic) when the UPS man dropped by with a package from RAW (their distributors).

After testing the brakes, the report concludes that "the Avid was superb. . . . [T]hey've got all the advantages of hydraulic discs . . . but with slightly less power." The bottom line is that the brakes are "powerful," "progressive," and "[make] up for all the old, crap cable discs." *Id.*

Chris Hatouinian, *Disc Brakes Mechanically Inclined Braking from Japan*, MOUNTAIN BIKING Feb. 2001, 31 (Exhibit D) echoes this sentiment:

> If you asked us a year or so ago what the future held for mechanical disc brakes, we would have told you someone thought the pet rock was a good idea at one time.
>
> But times have changed dramatically in the mechanical disc brake market for the year 2001, thanks mostly to Avid. The recent introduction of Avid's revolutionary performing mechanical disc brake turned the bike industry on it's ear, proving a more cost effective cable actuated disc brake could compete with hydraulics.

More from Matt MOUNTAIN BIKING Oct. 2000, 84 (Exhibit E) effusively informs:

> There's no doubt that the biggest news in disc brakes this year is the Avid Mechanical. It takes the currently available mechanical disc brakes, slaps them silly, gives them a wedgie, pulls their pants down and gives them a

whirly for good measure before kicking sand in their face and taking their girlfriend. It stops powerfully, it modulates, it has a good lever feel, it doesn't squeal, it's consistent, it doesn't fade. How many mechanical disc brakes have I said that about? For that matter, how many hydraulic discs have I said that about.

Disc Brake Buyer's Guide, BICYCLING, Dec. 2001, 63, 68 (Exhibit F) simply states that, "Avid's mechanical disc brake shatters the myth of hydraulic superiority." Or, as stated even more succinctly in *1985-2000,* MOUNTAIN BIKE, Jan. 2001, 60 (Exhibit G):

Avid's mechanical disc brake kicks ass on most hydraulic brakes . . .

In summary, the literature reveals a skepticism that mechanical disc brakes could compete with the power, modulation and smooth lever operation of hydraulic disc brakes, followed by an overwhelming surprise that registered upon ascertaining the unexpectedly superior performance of the Avid brakes. The very performance features repeatedly cited by these effusive reviews, namely power, modulation and smooth lever operation stem from the claimed structure. Such evidence weighs heavily in favor of a determination of nonobviousness.

Commercial Success

Commercial success is an indication of non-obviousness that must be considered in a patentability analysis. *Merck & Co., Inc. v. Biocraft Laboratories, Inc.*, 874 F.2d 804, 809, 10 USPQ2d 1843, 1848 (Fed. Cir. 1989) (1989). Commercial success is relevant if derives from the nature of the claimed invention, as opposed to other economic and commercial factors unrelated to the technical quality of the patented subject matter. That is, a nexus is required between the merits of the claimed invention and the evidence offered. *Cable Elec. Prods, Inc.*, 770 F.2d at 1027, 226 USPQ at 888.

The Avid mechanical brake was an immediate commercial success. The commercial success derives from the advantages inherent in the claimed structure, namely, smoothness, power, and modulation. For example, in a recent comparison of hydraulic and mechanical disc brakes, the Avid brake was rated best mechanical disc brake and best value of all disc brakes, for, among other reasons, superior modulation and stopping power. *Disc Brake Buyer's Guide*, BICYCLING, Dec. 2001, 63, 66 (Exhibit F). Telling in this detailed and exhaustive analysis is the outstanding modulation (8 of 10,

highest of any mechanical), lever effort (10 of 10, highest of any brake, mechanical or hydraulic), and consistency (9 of 10, highest of any mechanical), all of which result at least in part from the claimed structure. It is worth noting that the Avid mechanical out scored all disc brakes (mechanical and hydraulic) in the total score of evaluated criteria.

Market share, of growth in market share, replacing earlier units sold by others or of dollar amounts of sales are types of evidence that can establish the commercial success of the claimed invention. *See Kansas Jack, Inc. v. Kuhn*, 219 U.S.P.Q. 857 (Fed. Cir. 1983). As additional evidence that the commercial success was due to claimed features rather than extraneous factors, the declaration presents evidence of lack of advertising and prior lack of dominant position in the marketplace. As stated above, prior to the present invention, Avid did not manufacture or sell disc brakes. Beginning with no market share in the disc brake market, the brakes went from generating 0% of Avid revenues to 33% of Avid revenues in 2000, indicating an increase in the market share of for the disc brake market.

Commercial success is further evidenced by the remarkable climb from being specified by zero bike manufacturers to 33 of 87 manufacturers in 2 years. The number of bike models on which the Avid mechanical disc brakes are specified went from zero to 11 in one year. Thus, the Avid brake displaced Shimano, Hayes, Magura, Formula and other leading brands as a provider of rim or disc brakes as specified by numerous bicycle manufacturers. This displacement has been noted in public publications. *Outside Magazine, Buyer's Guide, 2001, Mountain Bikes, The Skinny,* OUTSIDE ONLINE, *at* http://www.outsidemag.com/magazine/buyguide2001/mountain_bikes/the_skinny.html (accessed Nov. 5, 2001) (Exhibit H) notes that "[o]ther component brands found on many new bikes include Avid (brakes), SRAM (Gripshift and derailleurs), and Truvativ (cranks)—all are worthy, as they've had to work hard to disentrench Shimano." Furthermore, a recent disc brake competitive analysis prepared by Mountain Biking Magazine and Bicycling Magazine, and provided to Avid (Exhibit I), indicates consumer approval of the brakes is high. While only 1.5% of magazine subscribers report owning Avid disc brakes in 2001, an amazing 22.5% of those respondents planning to buy brakes in the next year said they planed to buy Avid disc brakes (see attached).

Remarkably, Avid did no advertising in Bicycling Magazine and spent only $2600 on advertising featuring the Avid mechanical disc brake in 1999–2000 in Mountain Biking Magazine. In 1999, total ad placement expenditures were about $2,000. In the year 2000, total ad placement expenditures were about $21,300. No money has been spent on print advertising thus far in the year 2001.

Copying

Copying by others of the claimed invention, rather than one within the public domain, is indicative of non-obviousness. *Windsufring Int'l v. AMF*, 228 U.S.P.Q. 562, 565 (Fed. Cir. 1986) *cert. denied, BIC Leisure Prods. v. Windsurfing Int'l*, 477 U.S. 905, (1986). The declaration provides evidence of copying or incorporation of the claimed brake caliper by competitors, namely Shimano (Exhibit K), Suntour (Exhibit L), Formula (Exhibit M), Tektro (Exhibit N), and Lee Chi/Promax (Exhibit O). The cable feed structure of these devices reads on at least Claims 2 and 10 of the present application.

The remarkable commercial success of the Avid brake was achieved with only minimal advertising featuring the disc brakes. The commercial success can not be said to have derived from marketing, from a dominant position in the market, or other economic factors unrelated to the technical features of the claimed invention. Rather, the success derives from superior features of the brakes, such features inherently deriving from the claimed structure.

Summary

In summary, the claimed brake disc caliper met an unsolved need, namely the need for a mechanical disc brake having the power, smoothness, and modulation of a hydraulic disc brake. The power, smoothness, and modulation of the claimed brake caliper derives at least in part from the claimed structure, namely fixed cable guide and the curved surface of the cable guide feed which eliminates friction-causing bends in the cable and maintains the cable generally co-linear with the cable guide axis during actuation. The Avid mechanical disc brakes were adopted by the industry in a relatively short period of time, after initial skepticism of experts, followed by rave reviews expressing surprise at the performance of the brakes. The commercial success of the claimed brake caliper is evident in the increase of market share, specification by bike

manufacturers, and the escalating share of Avid's revenues resulting from the claimed mechanical disc brakes. Finally, the claimed feature was quickly copied by competitors who recognized the commercial value of the innovative features.

The evidence of secondary considerations, taken together with the failure of the cited prior art to teach or suggest the claimed invention, as well as any impetus to combine the references as asserted by the Examiner compels a withdrawal of the rejections under 35 USC § 103(a). Reconsideration is respectfully requested.

Closing Remarks

Applicant believes that the pending claims are in condition for allowance. If it would be helpful to obtain favorable consideration of this case, the Examiner is encouraged to call and discuss this case with the undersigned.

This constitutes a request for any needed extension of time and an authorization to charge all fees therefore to deposit account No. 19-5117, if not otherwise specifically requested. The undersigned hereby authorizes the charge of any fees created by the filing of this document or any deficiency of fees submitted herewith to be charged to deposit account No. 19-5117.

Respectfully submitted,

November 12, 2001

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Declaration of Wayne Lumpkin Pursuant to 37 CFR § 1.132

Attorney Docket No. AVID 13-2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	LUMPKIN, ET AL.		
SERIAL NO.:	09/685,284	EXAMINER:	KRAMER, D.
FILED:	OCTOBER 10, 2000	ART UNIT:	3613
TITLE:	CABLE FEED FOR A MECHANICAL BALL BEARING DISC BRAKE		

Assistant Commissioner for Patents
Washington, D.C. 20231

DECLARATION PURSUANT TO 37 C.F.R. § 1.132

Sir:

I, Wayne R. Lumpkin, declare and say:

I am one of the coinventors in the above-identified patent application.

Since 1991, I have been working in the field of bicycle component design and manufacture.

I am a founding member of Avid, LLC, assignee of the entire interest of the above-captioned application.

I am familiar with the above-identified patent application Serial No. 09/685,284.

Avid, LLC, manufactures and sells a mechanical disc brake which embodies the invention claimed in the above-captioned application. Attached hereto is a photo of the claimed brake as sold by Avid.

Mountain bike disc brakes have become popular in the last 3-4 years, particularly on more expensive bicycles. These high-end mountain bikes typically have retail prices from about $1,000 to several thousand dollars. Hydraulic disc brakes have been preferred for a number of performance reasons, including power, modulation (or control of brake application), and smoothness of the systems. Hydraulic disc brakes do have

disadvantages. Some of the drawbacks of hydraulic brakes are: the expense, the need for a dedicated brake lever, the difficulty of installation, the weight, the use of hydraulic fluid, which can be inconvenient and messy.

Mechanical disc brakes have been marketed since the 1970's. Mechanical disc brakes are sometimes called cable disc brakes, cable operated disc brakes, or cable-actuated disc brakes. Mechanical disc brakes that were developed prior to the present invention did not have some or all of the disadvantages of hydraulic brakes, such as the need to use hydraulic fluid. Typical of the mechanical disc brakes in this category were those manufactured by Shimano, Formula and Diatech. These mechanical disc brakes, however, performed poorly in that they lacked adequate power, were relatively difficult to actuate and poor modulation, mostly due to internal friction and friction on the cable. To the extent that these brakes were available, they were offered on lower-priced bike models, and were not considered to be suitable replacements for hydraulic disc brakes.

I recognized a need to develop a mechanical disc brake which retained the smoothness, power, and modulation of the hydraulic disc brakes, but which did not suffer from the disadvantages of hydraulic disc brakes, namely, high price, necessity of hydraulic fluid, and difficult or higher skill level required for maintenance.

Prior art mechanical disc brakes had attempted to reduce friction on the cable by providing a pivotal connection between a cable guide on the caliper housing and the caliper housing. As force is applied to an actuating arm of the disc brake, the cable guide pivots. Debris and corrosion interfere with the smooth pivoting of the cable feed. Additionally, it was my discovery that the pivot action of prior art mechanical disc brakes would fail under load.

To overcome these problems, I conceived of the claimed cable system, including a guide surface curved about the pivot axis having a first portion attached to the lever arm with the attachment point essentially coincident therewith and a second portion circumferentially spaced from the first portion, the second portion being essentially tangent to the guide axis with the lever arm in the non-actuated position, recited in the claims, maintains the cable essentially co-linearly with the cable guide access during actuation of the brake lever. This feature reduces friction on the cable, thereby providing improved modulation, smoothness and power. It also requires less force from the lever

return spring, further easing actuation, reducing user fatigue and facilitating one finger braking.

Prior to the present invention, Avid, LLC did not manufacture either hydraulic or mechanical disc brakes. The claimed mechanical disc brake was first offered for sale in mid-2000 for the 2001 model year. Given the poor performance of prior art mechanical disc brakes, there was skepticism regarding the performance of the disc brake; however, it soon became evident that the claimed brake caliper could provide smoothness, power, and modulation at a level competitive with hydraulic disc brakes.

Within one year of introduction into the market, the number of bike models on which the Avid mechanical disc brake was specified went from zero to 11. In model year 2002, less than two years after its introduction in the marketplace, the claimed mechanical disc brake was specified by 33 out of 87 principle bicycle manufacturers, including such prestigious manufacturers such as Cannondale, Schwinn, Giant and GT.

In most cases where the Avid mechanical disc brake was specified, it displaced another brake model, either rim or disc.

In November 2001, I was provided with a disc brake competitive analysis prepared by Mountain Biking Magazine and Bicycling Magazine. While only 1.5% of survey respondents report owning Avid disc brakes in 2001, 22.5% of those respondents planning to buy disc brakes in the next year said they planned to buy Avid disc brakes.

The mechanical disc brake has contributed to Avid's profitability. From the introduction of mechanical disc brake to the present, the brake went from generating no revenue for Avid, to generating 33% of the overall revenue of the company.

Competitors in the marketplace are incorporating the invention instead of using the prior art designs. The Avid design was first shown to prospective purchasers in late 1999 and January 2000. Soon after, the claimed features were incorporated by Shimano, a market leader in bicycle components. Attached hereto is a depiction of the Shimano mechanical disc brake.

Other manufacturers who have incorporated the claimed features are Tektro, Suntour and Lee Chi/Promax. Photos of these brakes are attached hereto.

Avid's disc brake specific advertising has been minimal. In 1999, expenditures for ad placement totaled just under $2,000. In 2000, ad placement expenditures totaled

about $21,300. Print advertising placement in Mountain Biking Magazine totaled $600 in 1999 and $2,012 in 2000. No money has been spent for such ads in Bicycling Magazine. Thus far in 2001, there have been no expenditures for such print advertising.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issuing thereon.0

Date: 11-9-2001 By: _____

Wayne R. Lumpkin

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